

## CLAIMS

1. An electromagnetic bearing for a thrust member having a distal region extending outwardly from a support comprising:
  - 5 at least one ferrous member having a coil, the ferrous member straddling the distal region of said thrust member, confronting surfaces of at least two extrusions of the ferrous member and thrust member defining control flux air gaps on opposite sides of the thrust member, and generating an electromagnetic control flux path through the air gaps whereby to axially position the ferrous member relative to the thrust member;
  - 10 confronting surfaces of at least one permanent magnet and either the thrust member or the ferrous member, defining at least one magnetic air gap spaced from at least one of the control flux air gaps, and generating a bias flux path parallel and non-coincident with the control flux path for a substantial portion of its length, wherein the permanent magnet is outside the control flux path and the length of each air gap in said
  - 15 bearing is limited to the physical separation of the confronting surfaces.
2. The electromagnetic bearing as in Claim 1, wherein the support is a rotating shaft.
3. The electromagnetic bearing as in Claim 1, wherein the thrust member is rotatable.
4. The electromagnetic bearing as in Claim 1, wherein the thrust member is a
- 20 stationary linear rail.
5. The electromagnetic bearing as in Claim 1, wherein the permanent magnet is a superconducting magnet.

6. The electromagnetic bearing as in Claim 1, wherein the bias flux is generated by two permanent magnets on opposing sides of the ferrous member or on opposing sides of the thrust member.
7. The electromagnetic bearing as in Claim 1, wherein the ferrous member straddles  
5 entirely the distal region of said thrust member.
8. The electromagnetic bearing as in Claim 1, wherein the thrust member includes a plurality of centering extrusions, whereby at least two centering extrusions are opposite the extrusions of said thrust member.
9. The electromagnetic bearing as in Claim 8, wherein the thrust member includes a  
10 centering extrusion opposite the permanent magnet.